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Language training and anodal transcranial direct current stimulation of the motor cortex in chronic aphasia

Flöel A.*, Darkow R., Meinzer M.

Department of Neurology Charite Universitätsmedizin Berlin

Introduction

A tight link between linguistic functions and activation of motor areas has been consistently reported, indicating that the two systems share functional neural resources (Pulvermuller, 2005). Few efforts have been made to explore whether this knowledge could aid the rehabilitation of aphasia. Previous small proof-of-principle studies demonstrated enhanced language function in chronic aphasia by pre-activation of the motor system (Meinzer et al., 2010), compared to control conditions.

Methods

We currently assess in a randomized controlled between-subject design whether intensive naming training over 10 days (2 hours per day, similar to Menke et al., 2009) plus 2 x 20 min of 1 mA anodal transcranial direct current stimulation (atDCS) over primary motor cortex (M1) per day, compared to training over 10 days plus sham stimulation, will significantly enhance naming ability at the end of training (primary outcome) and 3 months later (secondary outcome). Moreover, the Amsterdam Nijmwegen Everyday Language Test will be recorded before and after training. Patients with chronic aphasia (> 6 months post stroke), persistent mild to moderate aphasia and preserved M1 cortex in the left hemisphere are being recruited.

Results

So far, 10 aphasic patients have successfully completed the intervention (62 $\pm$ 10 years, 5 women, 40 months $\pm$ 24 post stroke). Preliminary analyses of naming ability immediately after training indicated a significant increase in both training groups (effect of intensive naming training). Additionally, patients in the atDCS group showed significant higher naming ability compared to patients in the sham group.
20 patients will be recruited in total. Final results of the trial will be available in 2014.

Discussion

Previous studies of our group and others demonstrated significantly enhance naming ability after training with concomitant atDCS, compared to sham, applied over preserved left prefrontal areas (Baker, Rorden & Fridriksson, 2010) or right-hemispheric language dominant cortical areas (Floel et al., 2011). However, such an intervention requires functional magnetic resonance imaging to determine the optimal stimulation site prior to stimulation, a procedure often not feasible in the

* Corresponding author.
E-mail address: agnes.floeel@charite.de .

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clinical setting. Our study will demonstrate if M1 electrical activation will significantly enhance naming ability at short-term (immediately after training) and medium-term (3 months) follow-up, in patients with chronic post-stroke aphasia. This intervention may enhance the effects of intensive language therapy in the chronic stage after stroke, and may open new avenues in the treatment of chronic aphasia.

References

Pulvermuller, F. (2005). *Brain mechanisms linking language and action.* Nat Rev Neurosci, **6**(7), 576-82.

Meinzer, M., et al.(2010). *Motor cortex preactivation by standing facilitates word retrieval in aphasia.* Neurorehabil Neural Repair, **25**(2), 178-87.

Menke, R., et al., (2009). *Imaging short- and long-term training success in chronic aphasia.* BMC Neurosci, **10,** 118.

Baker, J.M., C. Rorden, and J. Fridriksson (2010). *Using transcranial direct-current stimulation to treat stroke patients with aphasia.* Stroke, **41**(6), 1229-36.

Floel, A., et al. (2011). *Short-Term Anomia Training and Electrical Brain Stimulation.* Stroke.